Clean Hands in Healthcare

The challenge continues

Geeta Mehta MD MPH
Health care Associated Infections (HAI) complicate between 5 and 10% of admissions in acute care hospitals in industrialised countries.

At any given time, 1.4 million people worldwide suffer from infections acquired in hospitals. (WHO Estimates)

At least 50% of HAI are preventable

Every year unsafe injections result in 1.3 million deaths mainly due to Hepatitis B, Hepatitis C and HIV.
Magnitude of HAI in Developing Countries

- Data anecdotal, only WHO estimates available
- The risk of HAI is up to 20 times higher than industrialised countries approx 10% and 15-30% in acute care
### HAI rates reported from developing countries

<table>
<thead>
<tr>
<th>Type of survey</th>
<th>Prevalence (%)</th>
<th>Incidence (%)</th>
<th>Incidence (per 1000 patient-days)</th>
<th>Incidence (per 1000 device-days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital-wide</td>
<td>4.6i 19.1</td>
<td>2.5i 5.1</td>
<td>9.7i 41.0</td>
<td></td>
</tr>
<tr>
<td>Adult ICU</td>
<td>18.4i 77.2</td>
<td>4.1i 38.9</td>
<td>18.2i 90.0</td>
<td></td>
</tr>
<tr>
<td>Neonatal ICU</td>
<td></td>
<td>2.9i 57.7</td>
<td>2.6i 62.0</td>
<td></td>
</tr>
<tr>
<td>SSI</td>
<td></td>
<td>1.2i 38.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAP</td>
<td></td>
<td></td>
<td></td>
<td>2.9i 23.0</td>
</tr>
<tr>
<td>CR*-BSI</td>
<td></td>
<td></td>
<td></td>
<td>1.7i 44.6</td>
</tr>
<tr>
<td>CR*-UTI</td>
<td></td>
<td></td>
<td></td>
<td>3.2i 51.0</td>
</tr>
</tbody>
</table>

WHO Guidelines on Hand Hygiene in Health Care (2009)

10/1/2013
### Device-associated infection rates in ICUs in developing countries compared with NHSN

<table>
<thead>
<tr>
<th>Surveillance network, study period, country</th>
<th>Setting</th>
<th>N° patients</th>
<th>CLA-BSI*</th>
<th>VAP*</th>
<th>CR-UTI*</th>
</tr>
</thead>
<tbody>
<tr>
<td>INICC, 2002–2007, 18 developing countries(^1)</td>
<td>PICU</td>
<td>1,808</td>
<td>6.9</td>
<td>7.8</td>
<td>4.0</td>
</tr>
<tr>
<td>NHSN, 2006–2007, USA(^2)</td>
<td>PICU</td>
<td>/</td>
<td>2.9</td>
<td>2.1</td>
<td>5.0</td>
</tr>
<tr>
<td>INICC, 2002–2007, 18 developing countries(^1)</td>
<td>Adult ICU #</td>
<td>26,155</td>
<td>8.9</td>
<td>20.0</td>
<td>6.6</td>
</tr>
<tr>
<td>NHSN, 2006–2007, USA(^2)</td>
<td>Adult ICU #</td>
<td>/</td>
<td>1.5</td>
<td>2.3</td>
<td>3.1</td>
</tr>
</tbody>
</table>

* Overall (pooled mean) infection rates/1000 device-days
INICC = International Nosocomial Infection Control Consortium; NHSN = National Healthcare Safety Network; PICU = paediatric intensive care unit; CLA-BSI = central line-associated bloodstream infection; VAP = ventilator-associated pneumonia; CR-UTI = catheter-related urinary tract infection.

\(^1\) Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, El Salvador, India, Kosova, Lebanon, Macedonia, Mexico, Morocco, Nigeria, Peru, Philippines, Turkey, Uruguay
\(^2\) Medical/surgical ICUs
Global Action for Patient safety

Â 2000: Institute of Medicine USA, publishes report *To Err is human: Building a safer health system*

Â 2002: World Health Assembly Resolution calling Member States to work for patient safety

WHO Patient Safety Programme

*First 2 challenges:*

Å Clean Care is Safer Care:
Prevention of Health-care associated infection

Å Safe Surgery Saves Lives

10/1/2013
Clean Care is Safer Care

**Action areas**

1. Hand hygiene (clean hands) in healthcare,
2. Injection and immunization safety (clean equipment),
3. Emergency and surgical procedure safety (clean procedures),
4. Blood transfusion safety (clean products),
5. Safe water and sanitation (clean environment).

10/1/2013
Clean care is safer care

Focus Area

*Improving hand hygiene practice*
Why hand hygiene?

Hand hygiene is considered the **single most important measure** to prevent HAI.

Clean Care is Safer Care

10/1/2013
Ignaz Semmelweis, 1815-1865

- 1840s: General Hospital of Vienna
- Divided into two clinics, alternating admissions every 24 hours:
  - First Clinic: Doctors and medical students
  - Second Clinic: Midwives

Maternal Mortality
The Intervention:
Hand scrub with chlorinated lime solution

Hand hygiene basin at the Lying-In Women's Hospital in Vienna, 1847.
Effect on Maternal Mortality

~ Hand antisepsis reduces the frequency of patient infections ~

Adapted from: *Hosp Epidemiol Infect Control, 2nd Edition*
Effectiveness and limitations of hand hygiene promotion on decreasing healthcare-associated infections

- Observed 8,420
- Compliance improved from 43.3% in April 2004 to 95.6% in 2007
- 8.9% decrease in HAIs

Implementation of a HHP reduces preventable HAIs and is cost effective.

### Compliance with hand hygiene in different hospitals

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Sector</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preston</td>
<td>1981</td>
<td>General Wards</td>
<td>16%</td>
</tr>
<tr>
<td>Larson</td>
<td>1983</td>
<td>ICU</td>
<td>41%</td>
</tr>
<tr>
<td>Graham</td>
<td>1985</td>
<td>ICU</td>
<td>28%</td>
</tr>
<tr>
<td>Dubbert</td>
<td>1990</td>
<td>ICU</td>
<td>81%</td>
</tr>
<tr>
<td>Pittet and Boyce</td>
<td>2001</td>
<td>Hospital-wide</td>
<td>&lt;40%</td>
</tr>
<tr>
<td>Pittet</td>
<td>1993</td>
<td>ICU</td>
<td>45%</td>
</tr>
<tr>
<td>Larson</td>
<td>1992</td>
<td>Neonatal Unit</td>
<td>25%</td>
</tr>
<tr>
<td>Doebbeling</td>
<td>1992</td>
<td>ICU</td>
<td>32%</td>
</tr>
<tr>
<td>Zimakoff</td>
<td>1993</td>
<td>ICU</td>
<td>39%</td>
</tr>
<tr>
<td>Meengs</td>
<td>1994</td>
<td>Emergency Room</td>
<td>40%</td>
</tr>
<tr>
<td>Pittet</td>
<td>1999</td>
<td>Hospital-wide</td>
<td>48%</td>
</tr>
</tbody>
</table>

*Pittet and Boyce, Lancet Infectious Diseases 2001*
Assessing hand hygiene (HH) resources and practices at a large African teaching hospital

• HH was attempted in 12% of the opportunities
• Performed appropriately in 4% of the opportunities.
• Most main wards (89%) had at least 1 functional HH station
• Most commonly identified barriers to HH were limited resources and lack of knowledge on appropriate time(s) to perform HH
• Hand hygiene is crucial, cheap and underutilized

Owusu-Ofori A, Jennings R, Burgess J, Prasad PA, Acheampong F, Coffin SE. HH in limited care. 2010;31(8):802-8
HAND HYGIENE MAJOR COMPONENT OF ISOLATION PRECAUTIONS

HAND HYGIENE MAJOR COMPONENT OF HAI PREVENTION BUNDLES

10/1/2013
Catheter Related Blood Stream Infections

An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

Peter Pronovost, M.D., Ph.D., Dale Needham, M.D., Ph.D., Sean Berenholtz, M.D., David Sinopoli, M.P.H., M.B.A., Haitao Chu, M.D., Ph.D., Sara Cosgrove, M.D., Bryan Sexton, Ph.D., Robert Hyzy, M.D., Robert Welsh, M.D., Gary Roth, M.D., Joseph Bander, M.D., John Kepros, M.D., and Christine Goeschel, R.N., M.P.A.


Catheter-related bloodstream infections are common, costly, and potentially lethal. Each year in the United States, central venous catheters may cause an estimated 80,000 catheter-related bloodstream infections and, as a result, up to 28,000 deaths among patients in intensive care units (ICUs). Given that the average cost of care for a patient with this infection is $45,000, such infections could cost up to $2.3 billion annually. According to the National Nosocomial Infections Surveillance (NNIS) system of the Centers for Disease Control and Prevention (CDC), the median rate of catheter-related bloodstream infection in ICUs of all types ranges from 1.6 to 5.2 per 1000 catheter-days. Interventions aimed at decreasing the infection rate are needed to reduce the serious public health consequences of this hospital-acquired infection.
Catheter Related Blood Stream Infections

103 ICU
5 evidence based Intervention:
   - hand washing,
   - using full-barrier precautions during the insertion of central venous catheters,
   - cleaning the skin with chlorhexidine,
   - avoiding the femoral site if possible,
   - removing unnecessary catheters.

Results
   - Reduction of infection from 7.7 to 1.4/1000 catheter days
   - Sustained benefit
   - Broad use of this intervention could significantly reduce morbidity and the costs of care associated with catheter-related bloodstream infections.
Catheter Related BSI

Quality improvement report

Elimination of central-venous-catheter-related bloodstream infections from the intensive care unit

Andrew G Longmate¹, Kirsteen S Ellis¹, Louise Boyle¹, Shaun Maher¹, Chris J S Cairns¹, Suzanne M Lloyd², Colin Lang¹

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Accepted 3 July 2010

Abstract

Introduction Central-venous-catheter (CVC)-related bloodstream infection (CRBSI) is a complication of intensive care stay
Catheter Related BSI

Å Setting : ICU
Å Period 2005-2009
Å Intervention: Infection Surveillance
Å Care Bundle relating to insertion and maintenance of CVC
Å Reduction in CRBSI from 3.4 to 0/1000 patient days
Catheter Care Bundle

- CVC removal as soon as not required
- Perform hand hygiene before handling CVC.
- Clean injection ports with alcohol wipe before use.
- Avoid use of three way taps where possible and use needle-less adaptors for injection ports.
- Perform daily dressing inspection and, if soiled, clean site with chlorhexidine and replace dressing.
- Use a dedicated lumen for total parenteral nutrition.
WHO Tools and Resources for Improvement of Hand Hygiene

http://www.who.int/gpsc/5may/tools/en/index.html

10/1/2013
Recommendations for Administrators

The WHO Multimodal Hand Hygiene Improvement Strategy

*(based on the WHO Guidelines on Hand Hygiene in Health Care)*

5 components

10/1/2013
WHO Hand Hygiene Improvement Strategy

1. System change
   - Access to a safe, continuous water supply
   - to soap and towels;
   - readily accessible alcohol-based handrub

2. Training / Education

3. Evaluation and feedback

4. Reminders in the workplace

5. Institutional safety climate

10/1/2013
Case for Multimodal Approach

**Interventions**
- introduction of near-patient alcohol hand rubs
- series of posters
- supporting marketing materials
- Leaflets for patients that encouraged them to ask staff about cleaning their hands.

Increase in hand hygiene compliance (from 32% to 63%),

Usage of alcohol hand rub increased by 184%
Patients are willing to be empowered
Need for programmes that will empower both HCW and patients so that they are comfortable with their roles
Multimodal Strategy
Component 1

System Change:
Alcohol-based handrub at the point of care

Guideline recommendation 1

WHO Tools:
1. A Facility Situation Analysis
2. A Guide to Local Production (WHO tool)
3. Technical Information Sheet 5
4. Alcohol-based handrub production planning and costing tool
5. Economic budget impact analysis
6. Handrub tolerance and acceptability evaluation

Facility requirements:
Alcohol-based handrub at the point of care

Some key issues to consider
1. Is handrub used already?
2. Are they acceptable to staff?
3. Can they be purchased easily?
4. How much does the hospital have to invest and how many health-care-associated infections have to be prevented to ensure cost-effectiveness of the intervention?
Multimodal Strategy
Component 1

System Change:
Facilities to perform
handwashing
(infrastrucure)

Guideline
recommendation
1

1B

WHO Tools:
1. Facility Level
   Situation Analysis
2. Ward Structure
   Survey
3. Measurement of
   consumption of
   items for hand
   hygiene
   (water/soap or
   alcohol-based
   handrub)

Some key issues to consider
1. If access to running water is limited or non-existent, explore the feasibility of the use of alcohol-based handrubs.
2. Does the facility monitor the use of soap, or towels?
3. Is there equal access to the facilities for hand hygiene to all staff groups?

Facility requirements:
1. Access to running water, soap and towels
## Guideline recommendations 2,3,5,6,7,8,9

### Facility requirements:
1. Members of staff available to undergo training
2. Venue

### WHO Tools:
1. Facility Situation Analysis
2. Training pack
3. Information sheets 1: -7
4. Hand Hygiene Brochure
5. Pocket Leaflet
6. The 9 Guideline Recommendations Leaflet

### Some key issues to consider
1. How is infection control training delivered at present?
2. Can training related to the Multimodal Strategy be linked into existing training?
3. Is there support for a new programme?
4. Who will deliver the training?
5. Are there resources to deliver training?
Multimodal Strategy Component 3

Routine observation and feedback

Guideline recommendations 5,6,8

WHO Tools:
1. Facility Situation Analysis
2. Hand hygiene observation tools
3. Manual for observers
4. Training sessions for observers
5. Perception and knowledge assessment

Facility requirements:
Members of staff available to be trained in observation techniques

Some key issues to consider
1. Is there a programme of observational monitoring of hand hygiene already in place?
2. Can staff be easily encouraged to be trained to perform such monitoring?
3. What are the training requirements?
Multimodal Strategy Component 4

Reminders in the workplace

Guideline recommendations 5,6,9

WHO Tools:
1. Facility Level Situation Analysis
2. Information Sheet 7
3. Posters:
   - The 5 Moments
   - How to Handrub
   - How to Handwash
   - Combined How to Handrub/Handwash
   - Clean Hands, environment, practices, products, equipment

Facility requirements:
Areas to display posters and other reminders

Some key issues to consider
1. Are posters or other visual reminders already in place?
2. Can they be produced locally using local resources?
3. Is there a budget?
4. Are commercially produced posters used?
5. Is there a designated person to assist with the design of posters?
Multimodal Strategy Component 5

Improve the safety climate of the facility

Guideline recommendations 4,9

WHO Tools:
1. Facility Level Situation Analysis
2. Information sheets 1-7
3. Nine recommendations leaflet
4. Advocacy Leaflet
5. Training/education materials
6. Reminders in the workplace
7. Template letters

Some key issues to consider
1. Are hand hygiene omissions viewed as unacceptable?
2. Are senior clinicians, nurses and managers aware of the correct indications for hand hygiene (The 5 Moments)?
3. Are staff empowered to point out lapses in hand hygiene?
4. Are patients involved?

Facility requirements:
Top management support
5 Moments for Hand Hygiene

1. BEFORE TOUCHING A PATIENT
   Clean your hands after touching a patient and his/her immediate surroundings.

2. BEFORE CLEAN / ASEPTIC PROCEDURE
   Clean your hands immediately before accessing a critical site with infectious risk for the patient!

3. AFTER BODY FLUID EXPOSURE RISK
   Clean your hands after touching any object or furniture in the patient’s immediate surroundings without having to touch the patient.

4. AFTER TOUCHING A PATIENT
   Clean your hands immediately after a task involving exposure risk to body fluids (and after glove removal!).

5. AFTER TOUCHING PATIENT SURROUNDINGS
   Clean your hands after touching any object or furniture in the patient’s immediate surroundings, when leaving without having to touch the patient.

To protect yourself and the health-care environment from harmful germs!

10/1/2013
WHO Guidelines for Hand Hygiene
Recommendations

Hand hygiene can be achieved by soap and water handwash as well as alcohol based hand rub

Å Soap and water when hands are visibly soiled.
Alcohol based hand rubs in other situations
Å Hand hygiene after removing gloves.
Recommendations for Glove Use

• Gloves do not replace the need for hand cleansing with rubs or soap and water (IB).
• Gloves protect staff from blood and body fluids, non-intact skin and mucous membranes (IC).
• Remove gloves after caring for a patient. Do not use the same pair of gloves for more than one patient (IB).
• Change or remove gloves if moving from a contaminated body site to a clean site on the same patient (II).

WHO guidelines on hand hygiene in healthcare 2009

10/1/2013
The WHO Hand Hygiene Formulation

- Ethanol 80% or Isopropyl alcohol 75% v/v
- Hydrogen Peroxide 0.125% v/v
- Glycerol 1.45% v/v

WHO Guide to local production
http://www.who.int/gpsc/en
Survey on Local Production of HH formulation

Issues raised:
Â Training of pharmacists
Â Additional responsibility of existing staff
Â Remuneration
Â Requirements for production and storage
Â Guidance on large scale production
Â Quality of raw ingredients: chemical grade, acceptable manufacturers
Â Continuous supply, shortages
Â Theft and accidental ingestion
Â Laboratory facilities for quality check
Lady Hardinge Medical College
Experience: 2005-2006

Efficacy and Effectiveness of an indigenously prepared Alcohol Based Hand Rub

Training

Application

Efficacy
LHMC experience

Anti-Microbial Efficacy

The indigenously prepared ABHR based on WHO formulation was as efficacious as the commercially available control product when tested in the laboratory against *Esch. coli* and coagulase negative staphylococci
LHMC experience

Effectiveness in clinical setting

The use of alcohol based hand hygiene product in the clinical setting caused a significant increase in compliance with hand hygiene of health care staff as compared to washing with soap and water.
Pilot testing

• To provide local data on the resources required to carry out the recommendations;
• To generate information on the feasibility, validity, reliability and cost-effectiveness of the interventions;
• To adapt and refine proposed implementation strategies.
  – 8 sites, across 6 WHO regions

Clean Care is Safer Care
Inadequate Hand Washing Facility
Using the alcohol hand rub
UK October 2005

Alcohol based hand rub at the point of care
Involving Patients
Involving patients
Inclusion of hand hygiene in the medical curriculum.
Global Hand Hygiene Day

5th May

An annual initiative of the WHO Patient Safety Programme to promote Hand Hygiene in Health care

10/1/2013
Activities on 5th May 2010
Safety Comes First

“The very first requirement of a hospital is that it should do the sick no harm”

À Notes on Hospitals
1863

Florence Nightingale
Acknowledgements

WHO Patient Safety "Clean Care is Safer Care" team

10/1/2013